REGENERATIVE MEDICINE USE IN HORSES

Scientific advances culminating in the birth of regenerative therapies can help horses recover following injury

At one point or another, most athletic horses suffer some type of musculoskeletal injury, regardless of their performance level. Joints, tendons, and ligaments are among the most commonly affected structures.

In joint injury/disease for example, once the joint becomes inflamed, a series of events results in continued inflammation, culminating in pain, swelling, decreased range of motion, and a progressive deterioration of the articular cartilage lining the ends of long bones.

Tendons and ligaments, on the other hand, do attempt to heal, but instead of simply repairing or replacing injured fibers, the body produces scar tissue. Scar tissue has far less strength and elasticity than normal, healthy tendon and ligament fibers, which explains why tendon and ligament reinjury rates are so high despite prolonged recovery times (six to nine months or more).

Veterinarians use a variety of diagnostic tools to identify these injuries, including but not limited to physical exams and flexion tests, needle arthroscopy, MRI, X ray, and ultrasound. An accurate diagnosis can help veterinarians identify an appropriate treatment plan.

Treatment options vary greatly and can include rehabilitation, medical, shoeing, and surgical techniques.1 Of the many available treatment options, three — stem cell therapy, interleukin-1 receptor antagonist protein therapy (IRAP), and platelet-rich plasma (PRP) — fall into a unique class of therapies called “regenerative medicine.” As defined by the National Institutes of Health, “regenerative medicine is the process of creating living, functional tissues to repair or replace tissue or organ function lost due to age, disease, damage, or congenital defects.”2

The concept is to help the body repair injured tissues with its own cells to maximize healing.

STEM CELL THERAPY

Stem cell therapy appears to be a highly valuable tool for managing musculoskeletal injuries. Stem cells can be “coaxed” into becoming tissue-specific cell types, such as tendons and ligaments. Common stem cell sources include adipose (fat) tissue, bone marrow, fetal tissues, and even dental pulp.
PRP Platelets are specific types of blood cells that naturally contain a rich array of growth factors. Veterinarians can generate PRP using a commercial system that separates the platelets from other blood components, such as red and white blood cells, and concentrates them into an easily injectable product. Like IRAP, collecting a patient’s blood and using it to produce PRP makes this an autologous process, where the body’s tissues heal itself. Despite minimal research in this field, many sport horse practitioners report positive results after injecting PRP directly into injured joints. Based on the available data, between 2 and 6 mL of prepared PRP can be injected per joint. As with IRAP/ACS, post-injection flares can occur. The more widely accepted—and studied—use is in managing soft-tissue injuries. PRP appears to promote tissue healing (rather than laying down scar tissue), resulting in tendons and ligaments with improved strength and elasticity compared to untreated horses. In turn, horses have a reduced risk of reinjury. Once a veterinarian diagnoses a tendon or ligament lesion, PRP produced using a stallside kit can be injected directly into the defect using an ultrasound-guided or needle arthroscope approach. The “ fresher” the lesion the better, and injections can be repeated every three to four weeks.

**FUTURE DIRECTIONS IN REGENERATIVE THERAPY**

Still well within its infancy, regenerative medicine holds much promise in managing common musculoskeletal injuries. Now, as veterinarians and researchers become more comfortable with these techniques, exploration of novel uses of stem cells is increasing. Stem cells are being studied for use in horses with laminitis and even in the management of equine metabolic syndrome.

Additional research, especially in the realm of stem cells, to create optimal treatment protocols and identify appropriate combinations with other regenerative and rehabilitation therapies to maximize efficacy, remains a leading area of focus.

**Resources**